WHAT IS CLAIMED IS:

1. A composite organic-inorganic nanoparticle comprising a core and a surface, wherein the core comprises a metallic particle comprising a first metal and at least one organic compound.

2. The nanoparticle of claim 1, wherein the organic compound is a Raman-active organic compound.

3. The nanoparticle of claim 1, further comprising a second metal different from the first metal, wherein the second metal forms a layer overlying the surface of the nanoparticle.

4. The nanoparticle of claim 1 or 3, further comprising an organic layer overlying the metal layer.

5. The nanoparticle of claim 4, wherein the organic layer is covalently bound to the metal layer.

6. The nanoparticle of claim 4, wherein the organic layer comprises a probe.

7. The nanoparticle of claim 6, wherein the probe is selected from antibodies, antigens, polynucleotides, oligonucleotides, receptors, peptide nucleic acids (PNA), carbohydrates, or ligands.

8. The nanoparticle of claim 6, wherein the probe is a polynucleotide.

9. The nanoparticle of claim 8, wherein the polynucleotide is DNA or RNA.

10. The nanoparticle of claim 1, wherein the metallic particle comprises gold, silver, platinum, copper, or aluminum.

11. The nanoparticle of claim 1, wherein the metallic particle comprises gold.

12. The nanoparticle of claim 1, wherein the metallic particle comprises metal oxides.

13. The nanoparticle of claim 12, wherein the metallic particle comprises iron oxides.

14. The nanoparticle of claim 3, wherein the metal layer comprises silver, gold, platinum, copper, or aluminum.

15. The nanoparticle of claim 3, wherein the metal layer comprises silver.

16. The nanoparticle of claim 1, wherein the organic compound comprises at least one nitrogen atom and at least one aromatic ring.

17. The nanoparticle of claim 1, wherein the organic compound is a nitrogen-containing aromatic heterocycle.

18. The nanoparticle of claim 1, wherein the organic compound is adenine or an analog thereof.

19. The nanoparticle of claim 1, wherein the organic compound is adenine, 4-amino-pyrazolo(3,4-d)pyrimidine, 2-fluoroadenine, N6-benzolyadenine, kinetin, dimethyl-allyl-amino-adenine, zeatin, bromo-adenine, 8-aza-adenine, 8-azaguanine, 6-mercaptopurine, 4-amino-6-mercaptopyrazolo(3,4-d)pyrimidine, 8-mercaptoadenine, or 9-amino-acridine.

20. The nanoparticle of claim 1, further comprising a fluorescent label.

21. The nanoparticle of claim 1, wherein the Raman-active organic compound has a molecular weight less than about 500 Daltons.

22. The nanoparticles of claim 1, wherein the nanoparticles are substantially spherical.

23. The nanoparticles of claim 1, wherein the nanoparticles have a diameter about 20 nm up to 60 nm.

24. The nanoparticles of claim 1, wherein the nanoparticles are aggregated to form clusters ranging from about 50 nm to 200 nm.

25. A method for producing a composite organic-inorganic nanoparticle having a core and a surface, comprising:

reducing metallic ions in the presence of a Raman-active organic compound under conditions suitable to form a metallic colloid,

thereby producing a composite organic-inorganic nanoparticle having a core and a surface, wherein the core comprises the metallic colloid and the Raman-active organic compound.

26. The method of claim 24, further comprising forming a metallic layer overlying the surface of the nanoparticle, wherein the metallic layer comprises a second metal different from the metallic colloid.

27. The method of claim 26, wherein the metallic layer is formed by contacting the nanoparticle with a plurality of second metal ions under conditions suitable to reduce the second metal ions.

28. The method of claim 26, further comprising forming an organic layer overlying the metallic layer, wherein the organic layer is formed by contacting the nanoparticle with an organic compound under conditions suitable to form covalent linkages between the metallic layer and the organic compound.

29. The method of claim 25, 26 or 28, further comprising incorporation of a magnetic composition.

30. The method of claim 29, wherein the magnetic composition is an iron oxide.

31. A method for producing a composite organic-inorganic nanoparticle having a core and a surface, comprising

vapor-depositing a metal in the presence of a Raman-active organic compound under conditions suitable to form metallic nanoparticles, thereby producing a composite organic-inorganic nanoparticle having a core and a surface, wherein the core comprises metallic colloids and the Raman-active organic compound.

32. A method for producing a composite organic-inorganic nanoparticle having a core and a surface, comprising

etching a metal surface in the presence of a Raman-active organic compound under conditions suitable to form metallic nanoparticles, thereby producing a composite organic-inorganic nanoparticle having a core and a surface, wherein the core comprises metallic colloids and the Raman-active organic compound.

33. A method for detecting an analyte in a sample comprising:

contacting a sample containing an analyte with a nanoparticle of claim 6, wherein the probe binds to the analyte; and

detecting SERS signals emitted by the nanoparticle, wherein the signals are indicative of the presence of an analyte.

34. The method of claim 33, wherein the analyte is a biological agent.

35. The method of claim 33, wherein the analyte is a microorganism.

36. The method of claim 35, wherein the microorganism is a virus or a bacterium.

37. The method of claim 34, wherein the biological agent is a peptide, polypeptide, antibody, protein, or a polynucleotide.

38. The method of claim 34, wherein the biological agent is a polynucleotide.

39. The method of claim 33, wherein the biological agent is DNA, RNA, or peptide nucleic acid (PNA).

40. The method of claim 33, wherein the sample is an air sample.

41. The method of claim 33, wherein the sample is a liquid sample.

42. The method of claim 33, wherein the sample is a biological sample.

43. The method of claim 33, wherein the analyte is detected in an application which is a member selected from the group consisting of environmental toxicology, remediation, biomedicine, material quality control, food monitoring, agricultural monitoring, heavy industrial manufacturing, ambient air monitoring, worker protection, emissions control, product quality testing, oil/gas petrochemical applications, combustible gas detection, H_2S monitoring, hazardous leak detection, emergency response and law enforcement applications, explosives detection, utility and power applications, food/beverage/agriculture applications, freshness detection, fruit ripening control, fermentation process monitoring and control, flavor composition and identification, product quality and identification, refrigerant and fumigant detection, cosmetic/perfume applications, fragrance formulation, chemical/plastics/pharmaceuticals applications, fugitive emission identification, solvent recovery effectiveness, hospital/medical applications, anesthesia and sterilization gas detection, infectious disease detection, breath analysis and body fluids analysis.

44. A system for detecting an analyte in a sample comprising:

an array comprising more than one nanoparticle of claim 1;

a sample containing at least one analyte;

a Raman spectrometer; and

a computer comprising an algorithm for analysis of the sample.

45. A kit for labeling composite organic-inorganic nanoparticles comprising

a plurality of nanoparticles of claim 1, 2, or 6, and

a biological agent.

46. The kit of claim 45, wherein the biological agent is a peptide, polypeptide, protein, antibody, or a polynucleotide.

47. The kit of claim 45, wherein the biological agent is a polynucleotide.

48. The kit of claim 45, wherein the biological agent is DNA, RNA or peptide nucleic acid (PNA).

49. A method of identifying a microorganism comprising:

contacting a sample suspected of containing the microorganism with an array of nanoparticles of claim 1;

detecting SERS signals upon contacting the sample with the nanoparticles; and

associating the SERS signals from the nanoparticles with the identity of the microorganism.

50. A method of identifying an analyte comprising:

contacting a sample suspected of containing the analyte with an array of nanoparticles of claim 1;

detecting SERS signals upon contacting the sample with the nanoparticles; and

associating the SERS signals from the nanoparticles with the identity of the analyte.

detecting SERS signals upon contacting the sample with the nanoparticles; and

associating the SERS signals from the nanoparticles with the identity of the microorganism.

51. A microsophere comprising a polymeric bead and a plurality of nanoparticles of claim 1, wherein the nanoparticles are embedded within the polymeric bead.

52. The microsphere of claim 51, wherein the polymeric bead comprises a polyolefin.

53. The microsphere of claim 51, wherein the polymeric bead comprises polystyrene.

54. The microsphere of claim 51, wherein the polymeric bead comprises a polyacrylate.

55. The microsphere of claim 51, wherein the polymeric bead comprises a poly(meth)acrylate.